



**CS604- Operating Systems**  
**Solved Subjective**  
**From Final term Papers**

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**PSMD01**

## **CS604 – Final term Paper Fall (2012)**

**1. Write the names of common file structures. (2)**

**Answer:- (Page 214)**

- None
- Simple record structure
- Complex Structures

**2. Which part of compiler/assembler perform the task of taking one or more objects generated and assemble them in to a single executable program. (2)**

**Answer:- [Click here for detail](#)**

Linking means taking one or more objects generated by compilers and assemble them into a single executable program.

**3. Write the method through which Linus/Unix commands can communicate with each other. (2)**

**4. Consider a process having its segment 15 having 5096 bytes. The process generates a logical address (15, 3921). What page does the logical address refers to? (2)**

**Answer:- (Page 181)**

$\text{ceiling}[3921/1024] = 4$  (i.e., page number 3)

**5. What is mounting? Name its two types. (3)**

**Answer:- (Page 225)**

**Mounting** makes file systems, files, directories, devices, and special files available for use at a particular location. **Mount point** is the actual location from which the file system is mounted and accessed.

There are types of mounts:

Remote mount

Local mount

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**7. Which term is best suited for the situation where several process access and manipulate shared data concurrently and final value of data depend which process finishes last. (3)**

**Answer:-** [\(Page 96\)](#)

A situation like this, where several processes access and manipulate the same data concurrently and the outcome of the manipulation depends on the particular order in which the access takes place, is called a **race condition**.

**8. What is difference between deadlock avoidance and deadlock prevention. (3)**

**Answer:-** [\(Page 132\)](#)

**1. Deadlock prevention:** is a set of methods for ensuring that at least one of the necessary conditions cannot hold. These methods prevent deadlocks by constraining how processes can request for resources.

**2. Deadlock Avoidance:** This method of handling deadlocks requires that processes give advance additional information concerning which resources they will request and use during their lifetimes. With this information, it may be decided whether a process should wait or not.

**9. A file system must keep track of free blocks on disk. Name two schemes for doing this, and one advantage for each (5)**

**Answer:-** [Click here for detail](#)

Linked list of free pages supports very fast deletion: we can link a whole file onto the free list in constant time. Bit map facilitates spatial locality optimizations in disk layout. It is also the most efficient in terms of memory inside the OS required to find the free pages.

The list of pages with free page references in each is also space-efficient, particularly for disks that are mostly full (the bit map takes space proportional to the size of the entire disk). Also, free page insertion and deletion operations exhibit high locality under this scheme.

**10. Differentiate between logical and physical address. (5)**

**Answer:-** [\(Page 152\)](#)

An address generated by the CPU is commonly referred to as a **logical address**, where as an address seen by the memory unit—that is, the one loaded into the **memory-address register** of the memory—is commonly referred to as the **physical address**. In essence, logical data refers to an instruction or data in the process address space where as the physical address refers to a main memory location where instruction or data resides.

The compile time and load time binding methods generate identical logical and physical addresses, where as the execution time binding method results in different physical and logical addresses. In this case we refer to the logical address as the **virtual address**. The set of all logical addresses generated by a program form the **logical address space** of a process; the set of all physical addresses corresponding to these logical addresses is a **physical address space** of the process. The total size of physical address space in a system is equal to the size of its main memory.

The run-time mapping from virtual to physical addresses is done by a piece of hardware in the CPU, called the **memory management unit (MMU)**.



**11. Identify the necessary information that must be stored in process control block during the execution of program. (5)**

**12. What steps are needed for page replacement? (5)**

**Answer:- (Page 196)**

1. Find the location of the desired page on the disk
2. Find a free frame
  - a) If there is a free frame use it.
  - b) If there is no free frame, use a page replacement algorithm to select a victim frame.
3. Read the desired page into the newly freed frame; change the page and frame tables.
4. Restart the user process.

## **CS604 – Final term Paper Fall (2012)**

**QNo.1 Name of three major frame allocation schemes?**

**Answer:- (Page 204)**

There are three major allocation schemes:

- Fixed allocation
- Proportional Allocation
- Priority allocation

**QNo.2 how to protection of files and giving access to be secured in UNIX ?**

**Answer:- (Page 229)**

UNIX recognizes three modes of access: **read**, **write**, and **execute** (r, w, x). The execute permission on a directory specifies permission to **search** the directory.

**QNo.3 what is lazy analyzer that is use in virtual memory?**

**Answer:- (Page 186)**

When we want to execute a process, we swap it into memory. Rather than swapping the entire process into memory, however we use a lazy swapper.

**QNo.4 Differentiate between Cache and CPU Register ?**

**Answer:- [Click here for detail](#)**

CPU register is just a small amount of data storage that facilitates some CPU operations.

CPU cache, it is a high speed volatile memory which is bigger in size, that helps the processor to reduce the memory operations.

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**QNo.5 what is Index Allocation Method?**

**Answer:- (Page 235-36)**

Indexed allocation brings all the pointers to the block together into a disk block, known as the **index block**. Indexed allocation supports direct access without suffering from external fragmentation because any free block on the disk may satisfy a request for more space.

**QNo.6 Define and briefly describe what is memory mapping system calls?**

**Answer:- (Page 195)**

The memory mapping system calls can only support copy-on-write functionality allowing processes to share a file in read-only mode, but to have their own copies of any data they modify. So that access to the shared data is coordinated, the processes involved might use one of the mechanisms for achieving mutual exclusion.

In a UNIX system, mmap() system call can be used to request the operating system to memory map an opened file.

**QNo.7 What hardware is needed to support demand paging and swapping name and describe briefly?**

**Answer:- (Page 188)**

The hardware needed to support demand paging is the same as the hardware for paging and swapping:

- Page table: This table has the ability to mark an entry invalid through a valid-invalid bit or special value of protection bits.
- Secondary memory: This memory holds those pages that are not present in main memory. The secondary memory is usually a high speed disk. It is known as the swap device, and the section of disk used for this purpose is called the swap space.

**QNo.8 What are the file structures, define its protection.**

**Answer:- Rep**

**QNo.9 Differentiate between logical and physical address.**

**Answer:- Rep**

## **CS604 – Final term Paper Fall (2012)**

**Why do we say Scan algorithm, the elevator algorithm?? (2)**

**Answer:- (Page 244)**

The Scan algorithm is sometimes called the **elevator algorithm**, since the disk arm behaves like an elevator in a building servicing all the requests (people at floors), going up and then reversing to service the requests going down.

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**why program exhibits that it is always partially in memory (2 marks)**

**Answer:- (Page 185)**

Even in cases where the entire program is needed, it may not be all needed at the same time. The ability to execute a program that is only partially in memory confers many benefits. running a program that is not entirely in memory would benefit both the system and the user.

**give one advantage and one disadvantage of using large sized block (2)**

**Answer:- [Click here for detail](#)**

**advantage**

- Good for large rows with lots of sequential I/O
- Has a lower overhead with less block headers so more room to store data
- Well suited for tables with large sized rows

**disadvantage**

- Wastes space in the buffer cache if doing random I/O to access a small number of rows
- In OLTP systems can increase block contention due to more rows being stored in each block

**File attributes. only five (5)**

**Answer:- (Page 215)**

**Name:** The symbolic file name is the only information kept in human-readable form

**Type:** This information is needed for those systems that support different types.

**Location:** This location is a pointer to a device and to the location of the file on that device.

**Time and date created:** useful for security, protection and usage monitoring.

**Time and date last updated:** useful for security, protection and usage monitoring.

**name the steps involved in converting the source code into executable program (3)**

**Answer:- Rep**

## **CS604 – Final term Paper Fall (2012)**

**1. What do we name to address that is generated by CPU?**

**Answer:- (Page 152)**

An address generated by the CPU is commonly referred to as a **logical address**.

**2. Whether the files are volatiles or non-volatile? Also comment that whether data can be written on secondary storage if not written in file?**

**Answer:- (Page 214)**

Files usually non-volatile, so the contents are persistent through power failures, etc. A file is a named collection of related information that is recorded on secondary storage. Data cannot be written to secondary storage unless they are within a file.

**3. What anomaly is involved in FIFO page replacement?**

**Answer:- (Page 198)**

Belady's anomaly

**4. Differentiate between bg and fg command?**

**Answer:- (Page 65)**

You can use the fg command to resume the execution of a suspended job in the foreground or move a background job into the foreground. You can use the bg command to put the current or a suspended process into the background.

**5. Do you think that FIFO is useful? Provide at least two reasons of justify your answer?**

**Answer:- (Page 58)**

Two common uses of FIFOs are:

In client-server applications, FIFOs are used to pass data between a server process and client processes

Used by shell commands to pass data from one shell pipeline to another, without creating temporary files

**6. Explain how pre-paging prevents high level of initial paging?**

**Answer:- (Page 211)**

An obvious property of a pure demand paging system is the large number of page faults that occur when a process is started. This situation is the result of trying to get the initial locality into memory. Pre-paging is an attempt to prevent this high level of initial paging. The strategy is to bring into memory at one time all the pages that will be needed.

**7. Maximum no of pages in process address space is one million and total address size is  $(p + d)$ , process address space is 32-bit with page size 4096 bytes. Calculate no bits for page no (p) and the no of bits required for offset (d)?**

**8. Is it necessary to avoid user program from get stuck in an infinite loop? Give reasons.**

**Answer:- (Page 11)**

In addition to protecting I/O and memory, we must ensure that the operating system maintains control. We must prevent the user program from getting stuck in an infinite loop or not calling system services and never returning control to the CPU. To accomplish this we can use a **timer**, which interrupts the CPU after specified period to ensure that the operating system maintains control.

The timer period may be variable or fixed. A *fixed-rate clock* and a *counter* are used to implement a variable timer. The OS initializes the counter with a positive value. The counter is decremented every clock tick by the clock interrupt service routine. When the counter reaches the value 0, a timer interrupt is generated that transfers control from the current process to the next scheduled process. Thus we can use the timer to prevent a program from running too long.

In the most straight forward case, the timer could be set to interrupt every N milliseconds, where N is the **time slice** that each process is allowed to execute before the next process gets control of the CPU. The OS is invoked at the end of each time slice to perform various housekeeping tasks.



## CS604 – Final term Paper Fall (2012)

**Q1) Marks (2)**

Which part of compiler/assembler perform the task of taking one or more objects generated and assemble them in to a Single Executable Program.

**Answer:- Rep**

**Q2) How can a user control the Thrashing? Marks (2)**

**Answer:- (Page 11)**

In order to stop thrashing, the degree of multiprogramming needs to be reduced. The effects of thrashing can be reduced by using a local page replacement.

**Q3) What is the difference between Zero Capacity Buffering and Un-Bounded Capacity Buffering? Marks (2)**

**Answer:- (Page 44)**

**Zero Capacity:** The queue has maximum length zero, thus the link cannot have any messages waiting in it. In this case the sender must block until the message has been received.

**Unbounded Capacity:** The queue has infinite length; thus the sender never blocks.

**Q4) What is the basic logic of FIFO Page Replacement Algorithm? Marks (2)**

**Answer:- (Page 198)**

A FIFO replacement algorithm associates with each page the time when that page was brought into memory. When a page must be replaced, the oldest page is chosen.

**Q5) What is the difference between Internal Fragmentation and External Fragmentation Marks (3)?**

**Answer:- [Click here for detail](#)**

Internal Fragmentation is the area in a region or a page that is not used by the job occupying that region or page. This space is unavailable for use by the system until that job is finished and the page or region is released.

**Q6) What protection built in Primary Protection Scheme under Paging concept? Marks (3)**

**Answer:- (Page 169)**

The primary protection scheme guards against a process trying to access a page that does not belong to its address space. This is achieved by using a valid/invalid (v) bit. This bit indicates whether the page is in the process address space or not. If the bit is set to invalid, it indicates that the page is not in the process's logical address space.

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**Q7) Defined Soft (Symbolic) Link in UNIX. Marks (3)**

**Answer:- (Page 228)**

Soft links take care of all the problems inherent in hard links. They are flexible. You may have soft links to directories and across file systems. However, UNIX has to support an additional file type, the link type, and a new file is created for every link, slowing down file operations.

**Q8) How can you differentiate a call generated by the system is an Interrupt or Signal? Marks (3)**

**Answer:- (Page 7)**

An **interrupt** is a signal generated by a hardware device (usually an I/O device) to get CPU's attention.

A **trap** (or an *exception*) is a software-generated interrupt caused either by an error (division by zero or invalid memory access) or by a user request for an operating system service.

A **signal** is an event generated to get attention of a process. An example of a signal is the event that is generated when you run a program and then press <Ctrl-C>.

**Q9) Marks (5)**

**File system must keep track of free blocks on disk. Write down the two Schemes used for it with example?**

**Answer:- Rep**

**Q10) Address translation with Inverted Page Table? Marks (5)**

**Answer:- (Page 173)**

Page table size is limited by the number of frames (i.e., the physical memory) and not process address space. Each entry in the page table contains (pid, p). If a page 'p' for a process is loaded in frame 'f', its entry is stored at index 'f' in the page table. We effectively index the page table with frame number; hence the name inverted page table. Examples of CPUs that support inverted pages tables are 64-bit UltraSPARC and PowerPC.

## **CS604 – Final term Paper Fall (2012)**

**Briefly describe the concept of the reentrant code?**

**Answer:- (Page 174)**

Reentrant (readonly) code pages of a process address can be shared. If the code is reentrant, it never changes during execution. Thus two or more processes can execute the same code at the same time.

**To resolve thrashing due to excessive paging, what can a user do?**

**Answer:- [Click here for detail](#)**

To resolve thrashing due to excessive paging, a user can do any of the following:

- Increase the amount of RAM in the computer (generally the best long-term solution).
- Decrease the number of programs being run on the computer.
- Replace programs that are memory-heavy with equivalents that use less memory.
- Improve spatial locality by replacing loops



**How can we calculate a size of page table? Just provide the formula?**

**Answer:- (Page 165)**

Page table size = NP \* PTES, where NP is the number of pages in the process address space and PTES is the page table entry size.

**Describe the following command Grep "Asif" academics>admin**

**What are three different stages/times when address can be bound to instructions and data?**

**Answer:- (Page 151)**

compile time

load time

execution time

**What is the problem hard links creates in terms of referential naming? How does one solve it?**

**Answer:- [Click here for detail](#)**

When using hard links, we effectively create multiple names for the same data contained within a file. The problem in managing these structures comes down to knowing when the data within the file should actually be deleted. In particular, the data should be deleted only when the last name (or reference) is removed from the file system. This is typically detected through the use of reference counters.

It is also possible to create cycles in the directory structure, which can lead to files and/or directories being left on the disk without any way to get to the from the root directory. This may be solved by either not allowing hardlinks to directories or by explicitly checking to make sure that a cycle is not created when a link is made to a directory.

**If we take an average page fault service time of 20 milliseconds and a memory access time of 100 nanoseconds, then the effective access time in nanoseconds?**

**Answer:- (Page 190)**

$$\begin{aligned}\text{Effective access time} &= (1-p) * (100) + p (20 \text{ milliseconds}) \\ &= (1-p) * 100 + p * 20,000,000 \\ &= 100 + 19,999,900 * p\end{aligned}$$

**Analyze the relationship b/w fork() and except system calls?**

**Describe 5 attributes of the file?**

**Answer:- Rep**

**What hardware is needed to support demand paging and swapping name and describe briefly?**

**Answer:- Rep**

**Let us consider a situation in which we want to communicate un related process on the same system?**

**Answer:- (Page 50)**

The BSD sockets are used for communication between related or unrelated processes on the same system or unrelated processes on different systems.

Out of primary and secondary storage which memory do you think is best suited to store a program written in C language is which memory is best suited when we want to execute that program given reasons?

## CS604 – Final term Paper Fall (2012)

**How we do memory protection in memory management?**

**Answer:- (Page 10)**

Using two CPU registers, specifically designed for this purpose, can provide memory protection. These registered are:

Base register – it holds the smallest legal physical memory address for a process

Limit register – it contains the size of the process

**How to detect and recover deadlock?**

**Answer:- (Page 132)**

**Allowing Deadlocks and Recovering:** One method is to allow the system to enter a deadlocked state, detect it, and recover.

**Describe the following command Grep "Asif" academics>admin**

**What are three different stages/times when address can be bound to instructions and data?**

## CS604 – Final term Paper Spring (2012)

**1 what is mounting in the file system? and where is the mount point ?**

**Answer:- Rep**

**2 define Roll in & Roll out with respect to swapping**

**Answer:- (Page 157)**

When the higher--priority process finishes, the lower--priority process can be swapped back in and continued. This technique is called **roll out, roll in**. The major part of swap time is transfer time; the total transfer time is directly proportional to the *amount* of memory swapped.

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**3 Can we increase the speed by accessing the page table in the memory compare to the CPU register**

**Answer:- (Page 166)**

A page table base register (PTBR) is needed to point to the page table. With page table in main memory, the effective memory access time,  $T_{\text{effective}}$ , is  $2T_{\text{mem}}$ , which is not acceptable because it would slow down program execution by a factor of two.

**4 Explain the FIFO page algorithm with a scenario where the Belady's anomaly true**

**Answer:- (Page 198)**

The problem with this algorithm is that it suffers from Belady's anomaly: For some page replacement algorithms the page fault rate may increase as the number of allocated frames increases, whereas we would expect that giving more memory to a process would improve its performance.

**5 If we create a pipe and a pipe return a numeric value -1 what does it means?**

**Answer:- (Page 46)**

The function returns -1 if the call fails.

**6 Differentiate between dead lock avoidance and dead lock prevention**

**Answer:- Rep**

**7 Write one advantage and one disadvantage of using large size block**

**Answer:- Rep**

**8 Does cooperating processes are helpful to the operating system**

**Answer:- (Page 41)**

The concurrent processes executing in the operating system may be either independent processes or cooperating processes. A process is independent if it cannot affect or be affected by any other process executing in the system. Clearly any process that shares data with other processes is a cooperating process.

**9 How page fault frequency model used to control the thrashing**

**Answer:- (Page 210)**

Page fault frequency is another method to control thrashing. Since thrashing has a high page fault rate, we want to control the page fault frequency. When it is too high we know that the process needs more frames. Similarly if the page-fault rate is too low, then the process may have too many frames. The operating system keeps track of the upper and lower bounds on the page-fault rates of processes. If the page-fault rate falls below the lower limit, the process loses frames. If page-fault rate goes above the upper limit, process gains frames. Thus we directly measure and control the page fault rate to prevent thrashing.

**10 what is swap space?**

**Answer:- (Page 188)**

The secondary memory is usually a high speed disk. It is known as the swap device, and the section of disk used for this purpose is called the swap space.

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

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## CS604 – Final term Paper Spring (2012)

1) write the formula to calculate page size

Answer:- Rep

2) name of two registers used in segmentation

Answer:- (Page 175)

Segment-table base register (STBR)

Segment-table length register (STLR)

3) what is lazy analyzer that is use in virtual memory

Answer:- Rep

4) how to detect cycles in acyclic graph

Answer:- (Page 223)

A solution is to allow only links to files not subdirectories. Also every time a new link is added use a **cycle detection algorithm** to determine whether it is OK. If cycles are allowed, we want to avoid searching any component twice.

5) difference between deadlock avoidance and deadlock prevention 5marks

Answer:- Rep

6) name three access modes use in file protection

Answer:- Rep

7) how to detect and recover deadlock

Answer:- Rep

8) how semaphore algorithm works in n-critical problem 5marks

Answer:- (Page 108)

Hardware solutions to synchronization problems are not easy to generalize to more complex problems. To overcome this difficulty we can use a synchronization tool called a semaphore. A **semaphore S** is an integer variable that, apart from initialization is accessible only through two standard atomic operations: wait and signal. These operations were originally termed P (for wait) and V (for signal).

We can use semaphores to deal with the n-process critical section problem. The n processes share a semaphore, **mutex** (standing for mutual exclusion) initialized to 1.

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## CS604 – Final term Paper Spring (2012)

**What is mounting and mount count 2marks**

**Answer:- Rep**

**Some way to reduce external fragmentation 2marks**

**Answer:- [Click here for detail](#)**

Compaction reduces external fragmentation by shuffling memory contents to place all free memory together in one large block.

**Four characteristic of deadlock prevention 2 marks**

**Is starvation and deadlock are same. Accept or reject with solid reason 3 marks**

**Answer:- (Page 112)**

A set of processes are said to be in a deadlock state if every process is waiting for an event that can be caused only by another process in the set and Starvation is infinite blocking caused due to unavailability of resources.

**Why we need medium term scheduling? 3marks**

**Answer:- (Page 34)**

Some operating systems such as time-sharing systems may introduce a **medium-term scheduler**, which removes processes from memory (and from active contention for the CPU) and thus reduces the degree of multiprogramming.

**If hard real-time system cannot manage output within given slot then what happen? 3marks**

**Answer:- (Page 7)**

A **real time system** has well defined, fixed time constraints, and if the system does not produce output for an input within the time constraints, the system will fail. For instance, it would not do for a robot arm to be instructed to halt after it had smashed into the car it was building.

**Difference between deadlock avoidance and deadlock (snowz) prevention? 3marks**

**Answer:- Rep**

**Working of copy on write in virtual memory 5marks**

**Answer:- (Page 193)**

Demand paging is used when reading a file from disk into memory and such files may include binary executables. However, process creation using fork() may bypass initially the need for demand paging by using a technique similar to page sharing. This technique provides for rapid process creation and minimizes the number of new pages that must be allocated to newly created processes.

Recall the fork() system call creates a child process as a duplicate of its parent. Traditionally fork() worked by creating a copy of the parent's address space for the child, duplicating the pages belonging to the parent.

However, considering that many child processes invoke the `exec()` system call immediately after creation, the copying of the parent's address space may be unnecessary. Alternatively we can use a technique known as copy on write. This works by allowing the parent and child processes to initially share the same pages. These shared pages are marked as copy-on-write pages, meaning that if either process writes to a shared page, a copy of the shared page is created.

When it is determined a page is going to be duplicated using copy-on-write it is important to note where the free page will be allocated from. Many operating systems provide a pool of free pages for such requests. These free pages are typically allocated when the stack or heap for a process must expand or for managing copy-on-write pages. Operating systems typically allocate these pages using a technique known as zero-fill-on-demand. Zero-fill-on-demand pages have been zeroed out before allocating, thus deleting the previous contents on the page. With copy-on-write the page being copied will be copied to a zero-filled page. Pages allocated for the stack or heap is similarly assigned zero-filled pages.

## **CS604 – Final term Paper Spring (2012)**

**Q) What is mounting? And What is Mount Point?(p#226)**

**Answer:- Rep**

**Q) List down 2 major benefits of virtual memory**

**Answer:- (Page 185)**

- Virtual Memory is the separation of user logical memory from physical memory. This separation allows an extremely large virtual memory to be provided for programmers when only a smaller physical memory is available.
- Virtual memory makes the task of programming easier because the programmer need not worry about the amount of physical memory

**Q) Possible criteria to decide that which process should be terminated while dead lock detection and recovery,**

**Answer:- (Page 148)**

When a deadlock detection algorithm determines that a deadlock exists, several alternatives exist. One possibility is to inform the operator that a deadlock has occurred, and to let the operator deal with the deadlock manually. The other possibility is to let the system recover from the deadlock automatically. There are two options for breaking a deadlock. One solution is simply to abort one or more processes to break the circular wait. The second option is to preempt some resources from one or more of the deadlocked processes

**Q ) what does the following command do in the LINX/UNIX operating system (P #26)**

`$mkdir ~/courses/cs604/program`

**Answer:- (Page 26)**

Command creates the programs directory under your `~/courses/cs604` directory.



**Q) Sometimes mkfifo call may be failure, write the reasons for failure if mkfifo call in Unix?**

**Answer:- (Page 26)**

- File with the given name already exists
- Pathname too long
- A component in the pathname not searchable,
- Non-existent or non-directory
- Destination directory is read-only
- Not enough memory space available
- Signal caught during the execution of mkfifo()

**Q) Which factors are determined to choose a process for Termination?**

**Answer:- (Page 148)**

1. What the priority of the process is
2. How long the process has computed, and how much longer the process will compute before completing its designated task.
3. How many and what type of resources the process has used
4. How many resources the process needs in order to complete
5. How many processes will need to be terminated
6. Whether the process is interactive or batch

**Q) An address that is generated by CPU what is called? (2)**

**Answer:- Rep**

**Q)Write the steps needed forpage replacement?**

**Answer:- Rep**

**Q) Define mounting in Unix)**

**Answer:- Rep**

**Q) CPU sends the user or application request to the kernel. How kernal works on the request and fulfill it.**

**Answer:- (Page 15)**

any user or application request that involves access to any system resource must be handled by the kernel code, but user process must not be given open access to the kernel code for security reasons.

**Q) Write the steps for converting source code to executable form.**

**Answer:- Rep**

عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

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